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| 09/981,613 | 10/16/2001 | Paul L. Sinclair | 9792 | 5753 |

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| EXAMINER | |
|---|---|
| BLACK, LINH | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2163 | |

DATE MAILED: 01/27/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 09/981,613 | NCR CORPORATION | |
| | Examiner | Art Unit | |
| | LINH BLACK | 2163 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *31 May 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *7,9-11,13 and 14* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *7, 9-11, 13-14* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *22 June 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

## DETAILED ACTION

Examiner acknowledges Applicants' Appeal Brief filed on 5/31/2005.

Claims 7, 9-11, 13, and 14 are pending in the application. Claim 14 is appealed. However, to better shows to the Applicants a detail description of where the prior art taught claim 14's limitations, the Examiner hereby provides a more detailed office action to claim 14 below.

In view of the Appeal Brief filed on 5/31/2005, PROSECUTION IS HEREBY REOPENED. A non-final rejection to the pending claims 7, 9-11, 13, and 14 is set forth below.

To avoid abandonment of the application, Appellant must exercise one of the following two options:

(1) file a reply under 37 CFR 1.111 (if this Office Action is non-final) or a reply under 37 CFR 1.113 (if this Office Action is final); or,

(2) request reinstatement of the appeal.

If reinstatement of the appeal is requested, such request must be accompanied by a supplemental Appeal Brief, but no new amendments,

affidavits (37 CFR 1.130, 1.131 or 1.132) or other evidence are permitted. See 37 CFR 1.193(b)(2).

## *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 7, 9-11, 13-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kruglikov et al. (US 6105026), and further in view of Tow et al. (US 5860070).

As per independent claim 7, Kruglikov et al. teach:

a partition database system comprising: a plurality of storage facilities, each storage facility including data representing a plurality of table rows - fig. 1, elements 110-130 (partitions/segments of table rows of a table); col. 1, lines 1-64 (...the different partitions may reside on physically separate disk drives in the database system – col. 1, lines 62-64). Thus, each disk drive can store at least a partition or table rows.

wherein table rows in each storage facility that correspond to a specific table are logically ordered according to a row identifier (row ID) - fig. 1 (id#: the order of rows; partitioning key 102 – hire date: determines which record belongs in which partition or its associating hard disk depending on the hiredate value/field of the record); col. 1, lines 20-64.

the first value of the row ID is predominate in determining the order of the rows in the storage facilities – fig 1, ID#: determining the order of the row of the table and each partition of the table, thus, deteriming the order of the rows in each partition's associating hard disk.

the second value determines the order of those rows with identical first values – col. 1, lines 62-64 (the different partitions may reside on physically separate disk drives in the database system). Thus, each disk drive can store at least a partition or table rows; fig. 1, the partitioning key 102: hire date determines which record belongs in which partition or its associating hard disk depending on the hiredate value/field of the record. Different hire dates can have the same IDs, thus, the partitioning key 102 helps determing the order of those rows with identical first row ID#s because not only the

partitioning key 102: hire date determining which partition a record belongs but also arrange records in order in each partition according to the hire date.

Kruglikov et al. do not explicitly show: rows with identical first values. However, rows with identical first values and multi-columns keys are not novel in the prior art.

Tow et al. teach "method and apparatus of enforcing uniqueness of a key value for a row a data table" – the title. Tow et al. (USP 5860070) teach: "The term "value" is used to refer to the contents of row-column, whether numerals, characters, symbols, dates, raw byte strings, etc., or any combination thereof" – col. 2, lines 38-40; "In some databases, mutiple columns are used as keys. In table 210 of FIG. 2, for example, it might be possible for the CUSTOMER NUMBER value to be the same for two different rows, but for the combination of the CUSTOMER number value and the CUSTOMER NAME value to be unique in each row. This is illustrated more generally by table 410 of FIG. 4, in which a key value in any given row of the table spans more than one column." - col. 2, lines 32-56.
Tow et al. also teach: "row ID comprises a first value based on one or more columns of the table and a second value based on one or more columns of the table" - fig. 4, table 410 with a unique key spans all N columns thus, it

meets the limitation: "a first value based on one or more columns of a table and a second value based on one or more columns of the table"; col. 4, lines 57-62; col. 5, lines 10-16. Therefore, if the values of the customer number and customer name are the same for any two different rows, adding a third column to the key column will be needed in order to make the customer table key unique. The third value helps differentiate the rows having equal first and second values. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine Kruglikov et al.'s teaching with Tow et al.'s teaching of multi-column key in order to efficiently enforce the row uniqueness for each table partition or storage facility.

(limitation: "the third value determines the order of rows with identical first and second values; and the third value is a **uniqueness number** that differentiates rows having equal first and second values." Examiner interprets "uniqueness number as unique among rows having equal first and second values.)

As per claims 9-11, Kruglikov et al. teach:

a partition database system comprising: a plurality of storage facilities, each storage facility including data representing a plurality of table rows - fig. 1, elements 110-130 (partitions/segments of table rows of a table); col. 1,

lines 1-64 (...the different partitions may reside on physically separate disk drives in the database system – col. 1, lines 62-64). Thus, each disk drive can store at least a partition or table rows.

wherein table rows in each storage facility that correspond to a specific table are logically ordered according to a row identifier (row ID) - fig. 1 (id#: the order of rows; partitioning key 102 – hire date: determines which record belongs in which partition or its associating hard disk depending on the hiredate value/field of the record); col. 1, lines 20-64.

the first value of the row ID is predominate in determining the order of the rows in the storage facilities – fig 1, ID#: determining the order of the row of the table and each partition of the table, thus, deteriming the order of the rows in each partition's associating hard disk.

the second value determines the order of those rows with identical first values – col. 1, lines 62-64 (the different partitions may reside on physically separate disk drives in the database system). Thus, each disk drive can store at least a partition or table rows; fig. 1, the partitioning key 102: hire date determines which record belongs in which partition or its associating hard disk depending on the hiredate value/field of the record. Different hire

dates can have the same IDs, thus, the partitioning key 102 helps determing the order of those rows with identical first row ID#s because not only the partitioning key 102: hire date determining which partition a record belongs but also arrange records in order in each partition according to the hire date.

Kruglikov et al. teach a table with a partition key using ranges of dates (HIRE DATE) for partitioning the table – fig. 1; col. 1, lines 20-26 (in which a range of hire dates determines a partition which corresponds with row ids that contain hire date values in that certain range; the ranges of values derived from the hire date column). Kruglikov et al. do not explicitly show: rows with identical first values. However, rows with identical first values and multi-columns keys are not novel in the prior art.

Tow et al. teach "method and apparatus of enforcing uniqueness of a key value for a row a data table" – the title. Tow et al. (USP 5860070) teach: "The term "value" is used to refer to the contents of row-column, whether numerals, characters, symbols, dates, raw byte strings, etc., or any combination thereof" – col. 2, lines 38-40; "In some databases, mutiple columns are used as keys. In table 210 of FIG. 2, for example, it might be possible for the CUSTOMER NUMBER value to be the same for two different rows, but for the combination of the CUSTOMER number value and the

CUSTOMER NAME value to be unique in each row. This is illustrated more generally by table 410 of FIG. 4, in which a key value in any given row of the table spans more than one column." - col. 2, lines 32-56.

Tow et al. also teach: "row ID comprises a first value based on one or more columns of the table and a second value based on one or more columns of the table" - fig. 4, table 410 with a unique key spans all N columns thus, it meets the limitation: "a first value based on one or more columns of a table and a second value based on one or more columns of the table"; col. 4, lines 57-62; col. 5, lines 10-16. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine Kruglikov et al.'s teaching with Tow et al.'s teaching of multi-column key, and to incorporate ranges of dates in multi-column key in order to efficiently enforce the rows' uniqueness for each table partition or storage facility based on any type of information needed such as dates.

As per claim 13, Kruglikov et al. teach:

a partition database system comprising: a plurality of storage facilities, each storage facility including data representing a plurality of table rows - fig. 1, elements 110-130 (partitions/segments of table rows of a table); col. 1, lines 1-64 (...the different partitions may reside on physically separate disk

drives in the database system – col. 1, lines 62-64). Thus, each disk drive can store at least a partition or table rows.

wherein table rows in each storage facility that correspond to a specific table are logically ordered according to a row identifier (row ID) - fig. 1 (id#: the order of rows; partitioning key 102 – hire date: determines which record belongs in which partition or its associating hard disk depending on the hiredate value/field of the record); col. 1, lines 20-64.

the first value of the row ID is predominate in determining the order of the rows in the storage facilities – fig 1, ID#: determining the order of the row of the table and each partition of the table, thus, deteriming the order of the rows in each partition's associating hard disk.

the second value determines the order of those rows with identical first values – col. 1, lines 62-64 (the different partitions may reside on physically separate disk drives in the database system). Thus, each disk drive can store at least a partition or table rows; fig. 1, the partitioning key 102: hire date determines which record belongs in which partition or its associating hard disk depending on the hiredate value/field of the record. Different hire dates can have the same IDs, thus, the partitioning key 102 helps determing

the order of those rows with identical first row ID#s because not only the partitioning key 102: hire date determining which partition a record belongs but also arrange records in order in each partition according to the hire date.

Kruglikov et al. teach "the partitions depicted in Fig. 1 show range partitioning of the records in table 100, however, the methods described herein would also apply to other methods for partitioning e.g., hash partitioning...) – col. 9, lines 25-29.

Kruglikov et al. teach a table with a partition key using ranges of dates (HIRE DATE) for partitioning the table – fig. 1; col. 1, lines 20-26 (in which a range of hire dates determines a partition which corresponds with row ids that contain hire date values in that certain range; the ranges of values derived from the hire date column).
Kruglikov et al. do not explicitly show: rows with identical first values. However, rows with identical first values and multi-columns keys are not novel in the prior art.

Tow et al. teach "method and apparatus of enforcing uniqueness of a key value for a row a data table" – the title. Tow et al. (USP 5860070) teach: "The term "value" is used to refer to the contents of row-column, whether

numerals, characters, symbols, dates, raw byte strings, etc., or any combination thereof" – col. 2, lines 38-40; "In some databases, mutiple columns are used as keys. In table 210 of FIG. 2, for example, it might be possible for the CUSTOMER NUMBER value to be the same for two different rows, but for the combination of the CUSTOMER number value and the CUSTOMER NAME value to be unique in each row. This is illustrated more generally by table 410 of FIG. 4, in which a key value in any given row of the table spans more than one column." - col. 2, lines 32-56.

Tow et al. also teach: "row ID comprises a first value based on one or more columns of the table and a second value based on one or more columns of the table" - fig. 4, table 410 with a unique key spans all N columns thus, it meets the limitation: "a first value based on one or more columns of a table and a second value based on one or more columns of the table"; col. 4, lines 57-62; col. 5, lines 10-16. Tow et al. teach multi-column keys – fig. 4.

Tow et al. teach: "at block 320, the proposed key value is mapped into a target value (in a set of target values). The set of target values may be a set of hash values. Hashing and hash values are well-known in the art" – col. 4, lines 63-66. Tow et al. teach key value with hash value – col. 3, lines 29-53; fig. 4; col. 5, lines 10-26. Tow et al. teach hash/mapped values are distributed as desired" – col. 7, lines 18-28. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to

combine Kruglikov et al.'s teaching with Tow et al.'s teaching of multi-column key associated with hash values in order to provide an efficient locking mechanism in managing and distribution the data records among the storage facilities. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine Kruglikov et al.'s teaching with Tow et al.'s teaching of multi-column key, and to incorporate ranges of dates in multi-column key in order to efficiently enforce the rows' uniqueness for each table partition or storage facility based on any type of information needed such as dates.

As per claim 14, Kruglikov et al. (USP 6105026) teach:
"a partition database system comprising: a plurality of storage facilities, each storage facility including data representing a plurality of table rows" - fig. 1, elements 110-130 (partitions/segments of table rows of a table); col. 1, lines 1-64 (...the different partitions may reside on physically separate disk drives in the database system – col. 1, lines 62-64). Thus, each disk drive can store at least a partition or table rows.

"wherein table rows in each storage facility that correspond to a specific table are logically ordered according to a row identifier (row ID)" - fig. 1 (id#: the order of rows; partitioning key 102 – hire date: determines which

record belongs in which partition or its associating hard disk depending on the hiredate value/field of the record); col. 1, lines 20-64.

"the first value of the row ID is predominate in determining the order of the rows in the storage facilities – fig 1, ID#: determining the order of the row of the table and each partition of the table, thus, deteriming the order of the rows in each partition's associating hard disk.

the second value determines the order of those rows with identical first values" – col. 1, lines 62-64 (the different partitions may reside on physically separate disk drives in the database system). Thus, each disk drive can store at least a partition or table rows; fig. 1, the partitioning key 102: hire date determines which record belongs in which partition or its associating hard disk depending on the hiredate value/field of the record. The same ID# can have different hire date, thus, the partitioning key 102 helps determing the order of those rows with identical first row ID#s because not only the partitioning key 102: hire date determining which partition a record belongs but also arrange records in order in each partition according to the hire date.

The Merriam Webster's Collegiate Dictionary – Ten Edition teaches "distribute" as 1: to divide among several or many :AP. portion; 3b: to return the units of (as typeset matter) to storage.

table rows are distributed among the plurality of storage facilities based on the second value - col. 1, lines 62-64 (the different partitions may reside on physically separate disk drives in the database system). Thus, each disk drive can store at least a partition; fig. 1, the partitioning key 102: hire date determines which record belongs in which partition or its associating hard disk depending on the hiredate value/field of the record - col. 1, lines 20-26; Thus, table rows are distributed/divided among partitions which are stored on their associating disk drives/storage facilities based on the second value: hire date.

Kruglikov et al. do not explicitly show: rows with identical first values. However, rows with identical first values and multi-columns keys are not novel in the prior art.

Tow et al. (USP 5860070) teach: "The term "value" is used to refer to the contents of row-column, whether numerals, characters, symbols, dates, raw byte strings, etc., or any combination thereof" – col. 2, lines 38-40; "In some databases, mutiple columns are used as keys. In table 210 of FIG. 2, for example, it might be possible for the CUSTOMER NUMBER value to be the

same for two different rows, but for the combination of the CUSTOMER number value and the CUSTOMER NAME value to be unique in each row. This is illustrated more generally by table 410 of FIG. 4, in which a key value in any given row of the table spans more than one column." - col. 2, lines 32-56. Tow et al. also teach: "row ID comprises a first value based on one or more columns of the table and a second value based on one or more columns of the table" - fig. 4, table 410 with a unique key spans all N columns thus, it meets the limitation: "a first value based on one or more columns of a table and a second value based on one or more columns of the table"; col. 4, lines 57-62; col. 5, lines 10-16. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine Kruglikov et al.'s teaching with Tow et al.'s teaching of multi-column key in order to efficiently enforce the uniqueness among table rows for each table partition or storage facility.

### ***Response to Arguments***

Applicant's arguments filed 5/31/2005 have been fully considered but they are not persuasive. However, the examiner provides a more detailed office action to better disclose how the prior art of Kruglikov et al. together with Tow et al.'s teach the Applicants' limitations of the claim 14. The

limitation "distributing rows among the facilities" is taught by Kruglikov et al., please see the section above.

## ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LINH BLACK whose telephone number is 571-272-4106. The examiner can normally be reached on 8am - 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Safet Metjahic can be reached on 571-272-4023. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

LINH BLACK

Examiner
Art Unit 2163

January 23, 2006

Primary Examiner
Art Unit 2167